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From dispersed to clustered: New trend of spatial restructuring in China's metropolitan region of Yangtze River Delta

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ABSTRACT

Rapid growth of metropolitan regions has become a key issue in relation to urban governance and planning in developing countries. The past decades have witnessed a dramatic spatial restructuring in metropolitan regions in China. Although many studies have been done, conclusions are yet to achieve consensus. Several main arguments still need to be discussed further: how to identify this spatial restructuring process; what is general trend of spatial restructuring; and how the spatial restructuring are affected by a variety of institutional and economic factors. This study aims to address these arguments by scrutinizing the Yangtze River Delta (YRD) of China as a case. We use a new data set, namely, nighttime light data derived from the Operational Linescan System of Defense Meteorological Satellite Program, to explore the spatial restructuring of YRD from 1992 to 2012. Results found that urban growth in YRD has been dominated by a “dispersed” pattern before the 2000s due to local industrialization and political decentralization. However, after the 2000s, a new “clustered” trend evolved in YRD, and inequalities in regional development tend to increase. A few politically or economically (or both) advantaged cities became new growth centres, while other cities grew slowly. These advantaged cities mainly were mega cities and province capital cities. A growth of importance of domestic consumer market gave more economic opportunities to these advantaged cities which had a large population size and a better political capability to adapt new economic situation. In particular, they were enabled to have more powers to make locally privileged policies to attract investments and population in the current process of deeply market-oriented forms in China.

1. Introduction

Metropolitan regions refer to agglomerations of cities connected by close economic cooperation and convenient transportation networks (Gu, 2011). These regions are characterised by large population size, high density, economic agglomeration, high level of transport infrastructure services, and high land-use intensity (Fang et al., 2005). A metropolitan region is one type of metropolitan region, which include mega-cities. Metropolitan regions have become a vital platform of competition for economic worldwide within the context of globalization (Catalan, Sauri, & Serra, 2008; Lin GCS, 2001; Zhu & Zheng, 2012). Numerous studies have investigated various aspects of the features of metropolitan regions, such as population growth, spatial expansion, driving forces, and metropolitan governance (Catalan et al., 2008; Tsutsumida, Saizen, Matsuoka, & Ishii, 2015; Zeng et al., 2015).

Recently, an increasing number of research studies are attempting to examine metropolitan region restructuring in developing and industrializing countries (Blumenthal, Wolman, & Hill, 2009; Shrestha et al., 2012; Yin et al., 2011). Metropolitan region restructuring refers to structural changes, such as scale structure, spatial morphology, and population distribution, caused by the comprehensive roles of industrialization, urbanization, and globalization (Li, Wei Yehua, & Huang, 2014), and is a comprehensive concept of metropolitan evolution in multiple dimensions (Shaw & Satish, 2007). Spatial expansion is one of the main features of metropolitan region restructuring, but it means much more than spatial expansion. In some cases, metropolitan region restructuring does not necessarily lead to spatial expansion, but only to city-scale structural changes. And, spatial restructuring is influenced by multi-dimensional factors, including major policy making, globalization acceleration, and economic transition. In particular,

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spatial expansion is mainly driven by economic growth (Blumenthal et al., 2009; Stansel, 2005).

Many significant studies have been undertaken to explore metropolitan region restructuring. Yet, one distinct theoretical argument remains that concerns the process of restructuring. Many researchers hold the view of a metropolitan growth path: first clustered in large cities, and then dispersed into region (Ingram, 1998; Lin GCS, 2001). They believe that for many years metropolitan region restructuring has been guided primarily by a city-based paradigm, and population and production facilities are attractive in large cities because of the effects of economies of scale and scope (Ingram, 1998; Mera, 1973). Such a view is mainly applicable to understanding the metropolitan region restructuring in developed countries, which have a complete market economy (Ginsburg, Koppel, & Mcgee, 1991).

However, other researchers argue that in Asia, particularly China, metropolitan region restructuring has exhibited a remarkably different path because of the complexity of city. The ‘non-agricultural activities dispersed outside of large cities’ plays a key role in the formation of metropolitan regions rather than large cities. During the 1980s–2000s, China’s metropolitan growth, to a large extent, was mainly driven by urbanization (population migration from rural areas into the cities), a boom of local industrialization (growth of township enterprises) and the sizeable growth of international industrial enterprises from developed countries. The national economic decentralization and marketization which give more autonomy power to local governments is another key factor affecting urban development in small cities and in the urban fringe (Lin GCS, 2001).

Although some studies have focused on metropolitan formation in Asian countries in the 1980s and proposed the hypothesis of an extended metropolis (Lin GCS, 2001; Zhou, 1991), recent new trends in metropolitan spatial growth in developing countries should be given more attention. Specifically, for China’s metropolitan regions, three questions should be discussed further: what is new trend of spatial restructuring after the 2000s in the context of economic depression in the North America and the ongoing state-wide deep marketization reforms? How to identify the new trend? What are the factors in the new trend?

This study aims to answer these questions by undertaking a case study of the China’s Yangtze River Delta (YRD). YRD is one of the largest metropolitan region in China and has been recognised as one of the world’s six major urban agglomerations (Gottmann, 1976). The YRD metropolitan region has a population of 103 million, accounting for 7% of China’s population; covers an area of 210700 km², which accounts for 2.19% of the entire country; and contributes 9.01 trillion yuan to GDP, which accounts for 16.67% of China’s economy.

This highly innovative study makes two key contributions to the existing literature. First, the study uses a new method to identify metropolitan region spatial restructuring: a new data set, nighttime light (NTL) data, is employed. NTL data are derived from the Operational Line-scan System of Defense Meteorological Satellite Program (DMSP/OLS). These data have the advantages of continuity and availability, which are applicable for analysing large-scale and long-period metropolitan spatial restructuring. Spatial restructuring is examined in a 20-year period (i.e. 1992–2012), which is relatively longer than that of previous studies, such as Lin GCS, 2001 who focused on 1980–1990, Gao, Wei Yehua, Wen, and Chen (2014) on 1996–2008, and Jiao, Mao, and Liu (2015) on 2000–2010. Second, the study discusses new factors in recent trends of metropolitan region spatial restructuring in YRD. These factors mainly include trends of the economic decentralization (government’s investment), marketization (upgrading of market demand), new trend of globalisation (contribution of foreign direct investment (FDI)), and local industrialization (changes to the township enterprises’ role).

The rest of the paper is organized into six sections. Section 2 reviews the literature on metropolitan spatial restructuring. The method and data used for analysis are introduced in Section 3, while Section 4 analyzes the spatial restructuring process in YRD from 1992 to 2012.

Section 5 demonstrates the application of a multilevel model to assess the driving forces that influence metropolitan spatial restructuring. Finally, Section 6 presents the conclusions and discussion of research findings.

2. Literature review: metropolitan spatial restructuring and factors

Metropolitan spatial growth and restructuring are significantly related to the development of industrialization, urbanization, and globalization (Gao et al., 2014). After the industrial revolution in the 1860s, the United States and Western Europe underwent rapid industrialization. For many reasons, these countries moved an increasing number of production factors to large cities at an accelerated process, in which the economy of scale play a vital role. Subsequently, metropolitan regions greatly expanded primarily because of the residential dispersion from the central cities in the context of the rapid development of urbanization and modern transportation (e.g., in the United States) (Lin GCS, 2001; Lobo & Rantisi, 1999). Certain empirical studies have examined metropolitan spatial restructuring in developing countries (Lin GCS, 2001; Shaw & Satish, 2007).

Recently, metropolitan spatial restructuring in China has received more scholarly attention (Li & Yeh, 2004; Lin GCS, 1999; 2001). In China since 1978, the number of metropolitan regions has been growing in a high time–space compression environment during which the state decided to develop an open market economy within the socialist territory. Moreover, a regional rapid transit network, local autonomy, market reforms (e.g., land and housing market reforms), and adjustments to the administrative divisions also influenced metropolitan spatial restructuring (Huang et al., 2015; Li et al., 2015; Zhao, 2011). Exploring the fundamental driving factors and tracking their evolution is vital for understanding the logic of metropolitan spatial restructuring (Chen, Lu, & Zhang, 2009; Fang et al., 2005; Gu, 2011). Generally, the factors influencing metropolitan spatial restructuring can be summarized into four types of power, governance and political decentralization, marketization, globalization and local industrialization and investments (see Fig. 1).

Economic transition which is characterised by moving from a planned economy to a market economy is particularly prominent in transitional China (Li et al., 2015). Governments can promote urban spatial reconstruction through capital investment, industrial layout, and major projects, among other things (Chen et al., 2009). Since 1994, the role of both the central and local governments have changed because of decentralization reform (Lin GCS, 2001). Local governments have become increasingly powerful and exercise autonomous decision

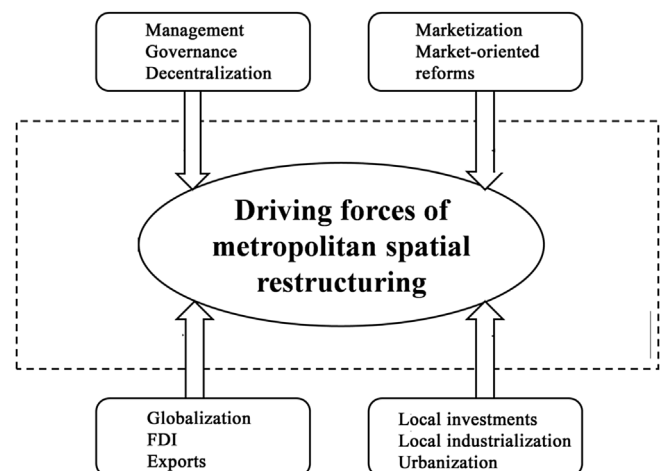


Fig. 1. A conceptual framework of driving forces of metropolitan spatial restructuring in China.

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